

**CHAPTER # 07****OPERATING SYSTEM (WINDOWS)****THE OPERATING SYSTEM:**

The operating system (OS), also called the software platform, consists of the master system of programs that manage the basic operations of the computer.

Operating system provides resource management services of many kinds. It handles the control and use of hardware resources, such as:

- ★ Disk space
- ★ Memory
- ★ CPU time allocation
- ★ Peripheral device

In general, an operating system written for one kind of hardware will not be able to run on another kind of machine. In other words, different operating systems are mutually incompatible.

TASKS PERFORMED BY OPERATING SYSTEM:

- ★ Booting
- ★ User Management
- ★ Memory Management
- ★ File Management
- ★ Task Management
- ★ Formatting
- ★ Security Management

BOOTING:

Booting is the process of loading of loading an operating system into a computer's main memory. The work of the operating system begins as soon as you turn on, or „boot“, the computer. This loading is accomplished by programs stored permanently in the computer's electronic circuitry.

When you turn on the machine the following boot process takes place:

- ★ Programs called diagnostic routines test the main memory, the central processing unit, and other parts of the system to make sure they are running properly.
- ★ BIOS (for basic input/output system) programs are copied to main memory and help the computer interpret keyboard characters or transmit characters to the display screen or to a diskette.
- ★ The boot program obtains the operating system, usually from hard disk, and loads it into the computer's main memory, where it remains until you turn the computer off.

Normally, your computer would boot from the hard drive, but if that drive is damaged you can use a floppy disk called a boot disk to start up your computer.

Cold Boot:

When you power up a computer by turning on the power „on“ switch it is called cold boot.

Warm Boot:

If your computer is already on and restart it, this is called warm boot or a warm start (by simultaneously pressing the Ctrl+Alt+Del keys or pressing the Reset button on your computer.

Use Interface:

User interface is the user-controllable display screen that allows you to communicate, or interact, with the computer.

The user interface is the „public face“ of computer operating systems.

The look and feel of the user interface is what distinguishes one operating system from another – a Windows 95 from a Windows XP, for instance, or a Windows 98 from Macintosh OS X.

Types of User Interfaces:

- ★ Command Driven Interfaces I Menu Driven Interfaces
- ★ Graphical User Interface (GUI)

Command Driven Interfaces required you to type in strange looking instructions. Menu Driven Interfaces uses the arrow keys on your keyboard or a mouse to choose a command from a menu, or list of activities. Graphical user Interface GUI, pronounced „goeey“. The GUI allows you to use a mouse or keystrokes to select icons (small pictorial figures) and commands from menus (lists of activities).

CPU Management:

The supervisor, or kernel, manages the CPU. It remains in main memory while the computer is running and directs other “nonresident” programs (programs that are not in main memory) to perform tasks that support application programs.

Thus, if you enter a command to print your document, the operating system will select a printer (if there is more than one). It will then notify the computer to begin executing instructions from the appropriate program (known as a printer driver, because it controls,) or „drive,“ the printer). Meanwhile, many operating systems allow you to continue writing. Were it not for this supervisor program, you would have to stop writing and wait for your document to print out before you could resume.

Memory Management:

Keeping track of the locations within main memory where the programs and data are stored. The operating system also manages memory. It can stop portions of data and programs between main memory and secondary storage. This capability allows a computer to hold only the most immediately needed data and programs within main memory.

There are several ways operating systems can manage memory:



Partitioning:

In partitioning, the OS divides memory into separate areas called partitions, each of which can hold a program or data.

Foreground / Background:

Some computer systems divide memory into foreground and background areas. Foreground programs have higher priority, and background programs have lower priority. When you’re working at your microcomputer, the foreground program is the one you are currently working with, such as word processing. The background program might be regulating the flow of print image to your printer.

Queues:

Programs that are to be executed wait on disk in queues. A queue is a temporary holding place for programs or data. The disk area where the programs or documents wait is called a buffer. Print Jobs are usually spooled – that is, placed in a buffer – where they wait in queue to be printed. This happens because the computer can send-print jobs to the printer faster than the printer can print them, so the jobs must be stored and then passed to the printer at a rate it can handle. Once the CPU has passed a print job to the buffer, it can take on the next processing tasks.

File Management:

A file is a named collection of related information. A file can be a program, such as word processing program. Or it can be a data file. such as a word processing document. a spreadsheet. images.

songs, and the like.

Files containing devices. The operating system records the storage location of all files. If you move, rename, or delete a file, the operating system manages such changes and helps you locate and gain access to it.

For example:

- ★ You can copy, or duplicate, files and programs from one disk to another.
- ★ You can back up, or make a duplicate copy of, the contents of a disk.
- ★ You can erase, or remove, from a disk any files or programs that are no longer useful.
- ★ You can rename, or give new file names to, the files on a disk.

Task Management:

A computer is required to perform many different tasks at once. In word processing, for example, it accepts input data, stores the data on a disk, and disk, and prints out a document – seemingly simultaneously. Some computers’ operating systems can also handle more than one program at the same time – word processing, spreadsheet, database searcher. Each program is displayed in a separate window on the screen. Others can accommodate the needs of several different users at the same time. All these examples illustrate tasks management.

A “task” is an operation such as storing, printing, or calculating.

Among the ways operating systems manage tasks in order to run more efficiently are:

- ★ Multitasking
- ★ Multiprogramming
- ★ Time-Sharing
- ★ Multiprocessing

Multitasking:

Multitasking is the execution of two or more programs by one user concurrently on the same computer with one central processor.

Earlier microcomputers could do only single-tasking, whereby an OS could run only one application program at a time. Thus, users would have to shut down the application program they were working in before they opened another application, which was inconvenient. Today, multitasking operating systems are used.

You may be writing a report on your computer with one program while another program plays a music CD. How does the computer handle both programs at once?

The answer is that the operating system directs the processor to spend a predetermined amount of time executing the instructions for each program, one at a time. Thus, a small part of the first program is processed, and then the processor moves to the remaining programs, one at a time, processing small parts of each. The cycle is repeated until processing is complete. Because the processor is usually very fast, it may appear that all the programs are being executed at the same time. However, the processor is still executing only one instruction at a time.

Multiprogramming:

Multiprogramming is the execution of two or more programs concurrently on a multi-user operating system.

As with multitasking, the processor spends a certain amount of time executing each user’s program. Once again, because the processor works so quickly, it seems as though all the programs are being run at the same time.

Time-Sharing:

In time-sharing, a single computer processor the tasks of several users at different stations in round-robin fashion.

Time-sharing is used when several users are linked by a communications network to a single computer. The computer will first work on one user's task for a fraction of a second, then go on to the next user's tasks, and so on.

This is accomplished through time slicing. Because computers operate so quickly, they can alternately apportion slices of time (fractions of a second) do various tasks. Thus, the computer may rapidly switch back and forth among different tasks, just as a hairdresser or dentist works with several clients or patients concurrently. Users are generally unaware of the switching process. Multitasking and time-sharing differ slightly. With multitasking, the processor directs the programs to take turns accomplishing small tasks or events, such as making a calculation, searching for a record, or printing out part of a document. Each event may take a different amount of time to complete. With timesharing, the computer spends a fixed amount of time with each program before going on to the next one.



Multiprocessing:

Multiprocessing is processing done by two or more computers or processors linked together to perform work simultaneously – that is, at precisely the same time.

As in multitasking, which involves only a single processor, the processing should be so fast that, by spending a little bit of time working on each program in turn, several programs can be run at the same time. With both multitasking and multiprocessing, the operating system keeps track of the status of each program so that it knows where it left off and where to continue processing. But an operating system capable of multiprocessing is much more sophisticated than that required for multitasking.

Two possible approaches to multiprocessing are:

- ★ Co-Processing
- ★ Parallel Processing

In co-processing, the controlling CPU works together specialized microprocessor called co-processor, each of which handles a particular task.

In parallel processing several full-fledged processors work together on the same tasks, sharing memory.

Formatting:

Formatting, or initializing, a disk is the process of preparing that disk it can store data or programs.

Today it is easier to buy pre-formatted diskettes. However, it's useful to know how to format a black floppy disk or reformat a diskette that wasn't intended for your machine.

Security Management:

Operating system now allow users to control access to their computers; this is especially important when several people use one computer and when on networks, in which various people use one system. Users gain access in the same manner as accessing their e-mail – via a user name and a password. If you are using a computer at work, you may be assigned a password. When you first boot up a new personal computer, the OS will prompt you to choose a user name and a password. Then, every time thereafter, when you boot up your computer, you will be prompted to type in your name and password.

DEVICE DRIVERS: RUNNING PERIPHERAL HARDWARE:

Device drivers are specialized software programs that allow input and output devices to communicate with the rest of the computer system.

Many basic device drivers come with system software when you buy a computer, and the system software will guide you through choosing and installing the necessary drivers.

If, you buy a new peripheral device, such as a mouse, scanner, or printer, the package will include a derive driver (probably on a CD-ROM). You'll need to install the driver on you computer's hard disk (by following the manufacturer's instructions) before the device will operate.

UTILITIES: SERVICE PROGRAMS:

Utility programs, also known as service program, perform tasks related to the control and allocation of computer resources. They enhance existence functions or provide services not supplied by other system software programs.

Most computers come with built-in utilities as part of the system software. (Windows 95/98/Me/2000/XP/Vista offers several of them.) However, they may also be bought separately as external utility programs (such as Norton Desktop and McAfee utilities).

Among the tasks performed by utilities are the following:

- ★ Backup
- ★ Data Recovery
- ★ Virus Protection
- ★ Data Compression
- ★ File De-Fragmentation
- ★ Disk Scanner

Backup:

A backup utility is used to make a backup, or duplicate copy, of the information on your hard disk.

Examples:

- ★ Norton Backup (from Symantec)
- ★ Colorado Scheduler

Data Recovery:

A data-recovery utility is used to restore data that has been physically damaged or corrupted. Data can be damaged by viruses, bad software, hardware failure, and power fluctuations that occur while data is being written / recorded.

Example:

Norton Utilities

Virus Protection:

Antivirus software is a utility program that scans hard disks, floppy disks, and memory to detect viruses. A virus consists of hidden programming instructions that are buried within an applications or systems program. Sometimes they copy themselves to other programs, causing havoc. Sometimes the virus is merely a simple prank that pops up in a message. Other times, however, it can destroy programs and data and wipe your hard disk clean. Viruses spread when people exchange floppy disks or download (make copies of) information from computer networks.

Some utilities destroy the virus on the spot. Others notify you of possible viral behavior. Because new viruses are constantly being created, you need the type of antivirus software that can detect unknown viruses.

Examples:

- ★ Norton Antivirus
- ★ Dr. Solomon's Anti-Virus Toolkits
- ★ McAfee's Virus Scan and Webclean

New viruses appear every day, so it's advisable to look or an antivirus utility that offers fragment updates without additional cost.

Although it's important to install an antivirus utility on your computer, risks are sometimes exaggerated. With few exceptions, if you don't boot your computer with a diskette in the drive, directly run programs downloaded from a network, open unknown files attached to e-mail, or use illegally copied program diskettes, your risk of virus infection is low.

DATA COMPRESSION:

Data compression utilities remove redundant elements, gaps, and unnecessary data from a computer's storage space so that less space (fewer bits) is required to store or transmit data. As you continue to store files on your hard disk, it will eventually fill up. You then buy new hard-disk cartridge drive and some cartridges and transfer the old files and programs to those. Or you can use data compression utility.

With a data compression utility, files can be made more compact for storage on your hard-disk drive.

With the increasing use of large graphic, sound, and video files, data compression is necessary both to reduce the storage space required and to reduce the time required to transmit such large files over a network. You may also want to compress a file to fit on a floppy disk, for portability.

As the use of sophisticated multimedia becomes common, compression and decompression will be increasingly taken over by built-in hardware boards that specialize in this process. That will leave the main processor free to work on other things, and compression/ decompression software utilities will become obsolete.

Example:

★ WinZip

★ PK Zip

★ StuffIt



File Defragmentation:

Fragmentation is the scattering of portions of files about the disk in nonadjacent areas, thus greatly slowing access to the files.

When a hard disk is new, the operating system puts files on the disk contiguously (next to one another). However, as you update a file over time, new data for that file is distributed to unused spaces. These spaces may not be contiguous to the older data in that file. It takes the operating system longer to read these fragmented files.

A defragmenter utility & program, commonly called a "Defragger", will find all the scattered files on your hard disk and reorganize them as contiguous files.

Defragmenting the file will speed up the drive's operation.

Disk Scanner (Scan Disk) and Disk Cleanup:

These utilities detect and correct certain types of common problems on hard disks and floppies and search for and remove unnecessary files, such as temporary files ("temp files"). The Windows OS creates files needed only for short tasks and auto-recovery. The computer should delete temp files when a program is closed but this doesn't always happen. Thus temp files can take up space.

COMMON OPERATING SYSTEMS:

- ★ Windows 3.x
- ★ Windows 9x
- ★ Windows NT/Windows 2000/Windows Millennium
- ★ Windows vista
- ★ OS/2 warp
- ★ UNIX
- ★ Linux (Developed by Linus Torvalds in 1990 while he was a computer science student at Helsinki University in Finland)
- ★ Mac OS
- ★ Netware

Platform:

The platform is the particular processor model and operating system on which a computer system is based.